have each his own laboratory and rooms where research may be conducted under his supervision.

4. That the scheme of any course of lectures delivered at the institute, whether by the director, the lecturer on bacteriology, or anyone else whom the council may appoint, be submitted to the council for their approval.

5. That the director should exercise a general supervision over the conduct of the institute, and be responsible for it to the council.

6. That all matters of expenditure at the institute should pass through the hands of the director, and that he should be entrusted with the appointment and dismissal of the servants of the institute.

7. That anyone desiring instruction at the institute, or wishing to engage in original research there, should make application to the director, who should have power to admit him.

8. That the director should present to the council a quarterly statement of the work carried on at the institute, and furnish a written annual report.

9. That leave of absence be granted by the council to the director and the lecturer on bacteriology, on the understanding that in each case an efficient substitute, approved by the council, be provided.

(Signed) H. E. ROSCOE.
VICTOR HORSLEY.
J. LISTER.

Electromotive Force from the Light of the Stars.

ON the invitation of Mr. W. E. Wilson, I came here a few days ago for the purpose of trying whether it was possible or not to obtain measurable electromotive forces from the light of the planets and of the fixed stars. The sensitive cells which we employed are seleno-aluminium-œnanthol cells, and (excepting the liquid) are the same as the seleno-aluminium-acetone cells which I described in the *Phil. Mag.* for March, 1892.

Last night was the only one on which observations were possible; and, owing to the state of the weather, it does not seem likely that, in the time at our disposal for joint-work, any more photo-electric measures can be made. The result of last night's work is to prove that the electromotive force of starlight is easily measurable.

The electrometer which we employed is Clifton's form of the quadrant electrometer of Lord Kelvin. It was placed in a room beneath that in which the telescope is fixed, and was thus kept quite dry and free from draughts. The telescope is Mr. Wilson's two-feet reflector; and the photo-electric cell, attached to a cell-carrier, was connected with the telescope in place of the eye-piece, and could be moved into or out of the image of the star at pleasure. The poles of the cell were connected with those of the electrometer by naked but well insulated fine wires led through a hole in the floor of the observatory. The area of the sensitive plate in the cell is about 3 square millimetres.

An E.M.F. of 1 volt was represented by 460 divisions of the scale, and the light of Venus gave about 40 divisions. Only about one quarter of the disc of the planet is at present illuminated, so that the E.M.F. of the whole light of the planet would have been represented by 80 divisions. [The square of the E.M.F. is proportional to the incident energy.] Thus the light of Venus concentrated by this telescope is represented by about ·17 volts.

With Jupiter about 14 divisions on the scale were obtained; but no conclusion can be drawn from this, because the image of Jupiter covered much more than the area of the sensitive plate. Hence the energy of his light corresponds to a much larger number than that given.

From the light of Sirius we obtained an E.M.F. of about ·02 volts (a little over 9 divisions on the scale).

An attempt on Aldebaran was not productive of any certain result, and was interfered with by an accident to the cell.

However, we consider that we have succeeded in our object, and we hope that, with a slightly improved cell-carrier and a much more sensitive electrometer, results will be obtained from the lights of a large number of fixed stars.

I would observe, in conclusion, that the relative values of the lights of Venus and of Sirius as given in the "Encyc. Brit." ("Photometry"), are most probably erroneous. It seems to me that the light of Venus very much exceeds the value there given. GEORGE M. MINCHIN.

Daramona House, Westmeath, January 8.

THE THYROID GLAND.

(WITH APOLOGIES TO MRS. HEMANS).

"WE hear thee speak of the thyroid gland,
But what thou say'st we don't understand;
Professor, where does that acinus dwell?
We hashed our dissection, and can't quite tell.
Is it where the macula lutea flows,
And the suprachoroidal tissue grows?"
—"Not there, not there, my class!"

"Is it far away where the bronchi part,
And the pneumogastric controls the heart?
Where endothelium endocardium lines,
And a subpericardial nerve intertwines?
Where the subpleural plexus of lymphatics expand?—
Is it there, Professor, that gruesome gland?"
—"Not there, not there, my class!"

"I have not seen it, my gentle youths,
But myxœdema, I'm told, it soothes.
Landois says stolidly, 'functions unknown':
Foster adopts an enquiring tone.
Duct does not lead to its strange recess.
Far below the vertex, above the pes,
It is there, I am told, my class!"

R. M.

NOTES.

PROF. ERNST HAECKEL completes his sixtieth year on February 16 next. On the following day a marble bust of him is to be placed in the Zoological Institute at Jena. Dr. Richard Simon, of Jena, is the treasurer for the fund opened for this purpose, and the following Englishmen are on the general committee:—Mr. F. Darwin, Dr. Gadow, Prof. Huxley, Prof. Ray Lankester, Sir John Lubbock, Prof. Alfred Newton, Mr. Poulton, Mr. Adam Sedgwick, Mr. Sollas, Mr. Herbert Spencer, and Sir Wm. Turner.

THE competition for the prize of 500 francs, founded by De Candolle for the best monograph on a species or a family of plants, has been opened by the Société de Physique et d'Histoire Naturelle of Geneva. The memoirs may be written in Latin, French, German, English, or Italian, and should be sent to the President of the Society before January 15, 1895. Members of the Society are not admitted into the competition.

M. MAREY has been elected vice-president of the Paris Academy of Sciences for the ensuing year.

THE death is reported, at Vienna, on December 2, 1893, at the age of 62, of Dr. J. Boehm, well known for his researches on the circulation of the sap in plants.

THE death is also announced of Baron K. von Küster, eminent in botanical circles; of M. Quinquand, known for his investigations on nutrition and toxicology, and other important physiological works; and of Dr. Heider, Privatdocent in Hygiene in Vienna University.

WE regret to record the death of Herr W. von Freeden, which occurred at Bonn, on the 11th inst., after a short attack of inflammation of the lungs. Herr v. Freeden is best known to science as the founder and first director of the Norddeutsche Seewarte of Hamburg, which in 1875 was developed into the Deutsche Seewarte, under Dr. George Neumayer. Herr v. Freeden was born at Norden, in Hanover, in 1822; he was first appointed Teacher of Physics and Modern Languages at the Gymnasium at Jever, a post which he exchanged for the Headmastership of the Navigation School at Elsfleth, near

Bremen. During his stay at Elsfleth he took an active part in the founding of the North German Lloyd's Company. In 1867 he resigned his position, and moved to Hamburg, where he established the Norddeutsche Seewarte, and in connection therewith organised the first system of storm warnings for the German coasts. The activity of this institution, which existed under the above title for eight years, was most creditable to its management. In February, 1875, the organisation was taken up by the Imperial Government, and Dr. v. Freeden was relieved of his office. He retired to Bonn, where he occupied himself with editing the *Hansa*, a nautical newspaper which he had started. He was for five years from 1871 Member for Hamburg of the Reichstag, but he declined re-election on removing his residence to Bonn.

THE *Kew Bulletin* says that Mr. W. Scott has been appointed Director of Forests and Botanical Gardens in Mauritius, in succession to Mr. J. Horne, who has recently retired.

DR. W. MIGULA has been appointed Professor of Botany at Karlsruhe Technical High School, Dr. W. Laposchnikoff Professor of Botany in Tomsk University, Siberia, and Dr. Zelinka Extraordinary Professor of Zoology in Graz University.

THE medals and funds to be given at the anniversary meeting of the Geological Society of London to be held on February 16 next, have been awarded as follows:—The Wollaston Medal to Prof. Karl A. von Zittel; the Murchison Medal to Mr. W. T. Aveline; the Lyell Medal to Prof. John Milne, F.R.S.; the balance of the proceeds of the Wollaston Fund to Mr. A. Strahan; that of the Murchison Fund to Mr. G. Barrow; that of the Lyell Fund to Mr. William Hill; and a portion of the proceeds of the Barlow-Jamieson Fund to Mr. Charles Davison.

DR. E. SYMES THOMPSON will deliver four lectures at Gresham College from January 22-26, his subject being "The Sense of Touch."

THE forty-seventh annual general meeting of the Institution of Mechanical Engineers will be held on February 1 and 2, when the President, Dr. William Anderson, F.R.S., will retire, and will be succeeded by Prof. A. B. W. Kennedy, F.R.S.

A COMPLETE skeleton of a Plesiosaurus, about 3¼ yards long, has been found, with other fossil remains, at Holzmaden in Würtemberg. It is being taken to the Berlin Museum.

PROF. CARR informs us that a very extensive and valuable collection of British and foreign plants has been presented to the Nottingham Natural History Museum by Mr. H. Fisher, late of Newark. Some idea of the nature and extent of the collection may be gathered from the following enumeration of the more important series included in it: (1) A practically complete herbarium of British plants, comprising about 2000 species and varieties, and about 10,000 specimens. (2) A European collection, comprising many thousand species from France, Germany, Switzerland, Austria, Roumania, Russia, Norway, Sweden, &c. (3) Several thousand species from North America. (4) A very fine collection from the Bombay Presidency. (5) About 1500 species from Natal, the Transvaal, and other plants of South Africa. (6) A small collection from Australia. Of the above collection that from Russia is of quite exceptional value and interest. It comprises species from all parts of the Russian Empire—from St. Petersburg, Lapland, and the Crimea, through Siberia to Kamskatka and Turkestan, also from the Trans-Caucasus and the Caspian region. The Spanish collection is an extremely fine and valuable one—probably one of the best in existence. In order to hand over the collection to the town in as complete and accessible a form as possible, Mr. Fisher is himself arranging and labelling the collection.

MUCH has been written and conjectured as to the origin of music, and the rhythmical movement of the body which is intimately associated with musical sounds. Dr. S. Wilks, F.R.S., discusses this problem in the January number of the *Medical Magazine*. He points out that it is felt by many that the origin admits of a physiological explanation; but others prefer to regard music as a purely spiritual faculty. All, however, who have considered the nature and origin of music believe that rhythm, as exemplified by movement, is very closely connected with it. The latest work on primitive music is by Wallaschek, and the conclusion he arrives at is that rhythm, or keeping time, lies at the very foundation of the musical sense. But rhythm and the time sense can be referred to muscular contraction and relaxation, for it has been long maintained by physiologists that the muscular sense is the measure of time, and intimately bound up with the idea of music. As Dr. Wilks remarks, there must be an up and down movement or rhythm in all muscular action, and this seems to be the same thing as the sense of time or rhythm of which Wallaschek speaks. In fact, the rhythmical sense insisted on by Wallaschek as the basis of music is, in all probability, the muscular sense which physiologists believe to form an intimate part of the musical faculty. Not in the different passions of the mind, but in muscular action, therefore, music appears to have had its origin.

THE internal temperature of trees has formed the subject of some investigations by M. W. Prinz (*La Nature*). The results show that the mean annual internal temperature of a tree is practically the same as that of the surrounding air, but the monthly means differ by two or three degrees. In general it takes a day for a thermal variation to be transmitted to the heart of a tree. On some days the internal temperature differs by as much as 10° C. from the air outside, but generally the difference is only a few degrees. When the air-temperature falls below the freezing point, the internal temperature of a tree descends to a point near that at which the sap freezes, and appears to remain there. The maximum temperature of the interior of the trunk of a tree may occur some time before the maximum is reached by the surrounding air, owing to the action of the spring sun upon the tree while devoid of foliage. During the high temperatures of summer, the internal temperature was proved by the investigations to be about 15° C. with a variation of 2° C. at the most. Speaking generally, a large tree is warmer than the air in cold months, and a little colder than the air during the summer months.

DURING the recent frost, large masses of ice containing numerous freshwater eels were carried down the River Arun to Littlehampton. This affords an interesting example of the manner in which freshwater fish in a perfect state of preservation may be buried in some number in marine deposits.

MR. J. STIRLING, in his second special report on the Victorian Coal-fields, describes the various areas in detail, referring amongst other points to littoral and subaerial denudation and to the origin of soils. In the Kilcunda district numerous boreholes for coal have been put down by Government—one to a depth of 1158 feet.

MR. J. J. STEVENSON, in the *Bulletin* of the Geological Society for America, vol. v., discusses the origin of the Pennsylvania anthracite, and shows that there is no relation between the amount of disturbance of the strata and the production of anthracite. The coal becomes more anthracitic as the seams thicken towards the north-east; in this direction the coal seam, whilst in process of formation, would be longer exposed to chemical change.

DR. W. F. HUME read a paper on "The Genesis of the Chalk" before the Geologists' Association on January 5. He showed that, viewed in its general aspect, the Chalk Period bears evidence of the almost continuous gain of elevation over depression influence. According to his researches, the Upper Greensand is the expression of coast-line conditions, the currents transporting shore material being sufficiently strong to make their influence felt over 150 miles from land. The chloritic marl probably represents the denuding effect of the advancing sea upon the sinking land. The chalk marl and grey chalk seem to have been deposited in areas of gradual subsidence; judging from the change in the Foraminifera, the gradual reduction in size and quantity of quartz and glauconitic grains, and the absolute disappearance of heavy minerals (zircons, &c.) in the higher zones of the Lower Chalk. The great purity of the chalk in the *Terebratulina gracilis* zone, and the almost entire absence of a heavy residue, indicates that the maximum depression for the Middle Chalk period very probably occurred about the time of the laying down of its central beds. From this zone onwards the chalk becomes more and more marly, passing finally into the condition of the chalk rock, that is, a truly nodular bed. The reappearance of quartz and glauconite grains, and heavy minerals (Tourmaline, Augite, and Hornblende), all point to this rock as having been formed during a period of elevation. The zones of the Upper Chalk show typically the continuation of great depression, for the flints gradually become reduced in size, and pass through various changes of shape, that is to say, from irregular to zoned, and finally to the tabular form.

AN important experimental research on the "Decomposition of Liquids by Contact with Powered Silica," was described by Dr. G. Gore at a recent meeting of the Birmingham Philosophical Society. The method of experiment employed was simply to take 25 centims. of a solution of an acid, salt, or alkali, of known composition, which had no chemical action upon pure precipitated silica (or other suitable insoluble powder), in a stoppered bottle; add to it 50 grains of the powder, thoroughly agitate the mixture, set it aside, usually about sixteen hours, and analyse the clear liquid portion. This enabled the chemical composition of the film of liquid which adhered to the powder to be approximately ascertained, and the influence of surface tension upon such composition to be examined. The experiments show that the chemical composition of films of liquid adhering to solids may be approximately ascertained by this method. They further show that the power of abstracting dissolved substances from liquids is a common property of finely divided solid bodies, and that the amount abstracted varies with the kind of powder employed; the degree of fineness of the powder, and consequently the amount of its surface; the kind of dissolved substance; the proportion of powder to dissolved substance; the kind of solvent; the proportion of solvent to powder; the proportion of dissolved substance to solvent; and, in a small degree, with the temperature. The union takes place quickly, and a long period of time has but little influence. Finely precipitated silica possesses the property in the greatest degree, and alkaline substances are the most affected; with very dilute alkaline solutions more than 80 per cent. of the dissolved substance was abstracted by the silica. The results appear to throw some light upon the purification of water by filtration through the earth and upon agriculture, and to show that the alkaline constituents of soils are retained much more by the silica than by the alumina. The effects of silica upon weak solutions of potassium cyanide indicate that the great loss of the latter substance in the commercial process of extracting gold and silver from powdered quartz is largely due to the "adhesion" of that salt to the silica. And the results obtained with silica and a very weak solution of iodine indicate a possible method of extracting the latter substance from solutions, and the recovery of the iodine from the silica by distillation. The research brings more closely together the subjects of physics and chemistry.

THE *Analele* of the Roumanian Meteorological Institute, vol. vii., contains an account of a glazed frost, or smooth coating of ice, which occurred on November 11 and 12 last over a very large tract of country, and caused much damage to trees and telegraph lines; some of the trees had not only their boughs, but even their trunks broken by the weight of the deposit. Dr. Hepites states that in this case the cause of the formation of the glazed-frost was not that the rain fell upon objects at a temperature below zero, as the phenomenon has sometimes been explained, but that it is probable that the drops of rain were in a state of superfusion, and became frozen on touching the objects on which they fell. When the glazed-frost commenced, the temperature on the ground was 36°·5. In the neighbourhood of Bucharest the telegraph wires were coated with ice an inch in diameter, and were thickly studded with stalactites of ice. The weight of this coating over the length of a metre of the wire was thirteen times as heavy as the wire itself.

THE numerous attempts which are at the present time being made to utilise the energy which runs to waste wherever there is a waterfall, and which have lately had considerable public attention drawn to them on account of the publication of Prof. Forbes' paper on the utilisation of the Niagara Falls, have received an interesting addition in the attempt that is being made on the canal between the Seine and Saône. It occurred to M. Galliot, an engineer at Dijon, to utilise the water power of the fall of water at the lock sluices to drive turbines and dynamos, the current obtained being used to propel the boats on the canal. The electric power is conveyed along the canal by means of a wire supported on posts, and each tow-boat is provided with a motor which takes its current from this wire. The propulson of the tow-boat is effected, not by means of a screw propeller on the boat, but by a train of gear wheels connecting the motor to a chain which extends along the bottom of the canal, and by means of which the boat drags itself along. In addition to working the canal boats, the electric power is utilised to light up the interior of a tunnel through which the canal passes.

A PROPOSAL for a standard of "normal air" is made by M. A. Leduc in the *Comptes Rendus*. It is to be one litre of air taken at a place outside any town in a level country, and during calm weather. Freed from carbonic acid and water vapour, as well as traces of other accidental gases, such a litre of air would contain 23·2 per cent. by weight of oxygen. Since this proportion is variable in the same place by about 4 units in the second decimal place, it is useless to determine the weight of this litre of air to within more than 1/10000 of its value. A careful series of determinations gave 1·2932 gr. for this weight at 0° C., at the latitude of Paris, and at 760 mm. pressure. Under 1 C.G.S. atmosphere, this weight would be 1·2758 gr. This standard would be sufficiently well defined for most practical purposes, but where greater accuracy is required, M. Leduc proposes to employ nitrogen as a standard of reference for gas densities. The weight of the normal litre of nitrogen at Paris is 1·2570 gr., or 1·24 gr. under 1 C.G.S. atmosphere, within 0·1 mgr.

THE *Journal de Physique* for December contains a paper by M. Violle, on the electric furnace and the light given out by, and the temperature of, the electric arc. In a former note a description of the form of furnace used by M. Violle has been given. The author considers that his experiments show that the electric arc is the seat of a perfectly definite physical phenomenon, namely, the ebullition of carbon, for the arc is characterised by a constant brightness (*i.e.* the light given out by a given area of the positive crater is constant), and by the temperature being always the same, as well as by all the circumstances which characterise normal ebullition. The constancy of the character of the light given out by the arc has been noted by Abney and Festing, who have adopted it as the standard of white light, and the author's observations show that whatever be the watts consumed in the lamp, the brightness remains constant. This he has shown by direct comparison with a standard light, and also by photographing the positive carbon, when the density of the image remained constant.

PROF. S. P. LANGLEY, who has recently been giving a large amount of attention to ærodynamics, contributes a remarkable paper to the current *American Journal of Science* on what he calls "The Internal Work of the Wind." The conclusions attained in this paper lead the author to the confident assertion of the mechanical and practical possibility of a heavy body, provided with suitable plane or curved surfaces, being suspended indefinitely in a wind, or even advancing against it without connection with the ground or the expenditure of internal energy. This is to be brought about by utilising the heterogeneous structure of wind, which Prof. Langley shows to consist of puffs succeeding each other several times per minute. This was proved by the records of some very light anemometers with paper cups, mounted on the roof of the Smithsonian Institution, at 153 feet above the ground. The electric record was made at every half revolution. In one case a wind of 23 miles an hour rose within 10 seconds to a velocity of 33 miles an hour, and fell to its initial speed in another 10 seconds. It then rose within 30 seconds to 36 miles an hour, and so on, passing through a series of maxima and minima separated by intervals of about 10 seconds, and sometimes stopping altogether. This observation may serve to solve the long-discussed problem of the soaring of birds. A wind acting against a free plane at a suitable angle will urge it upwards until the plane has assumed the velocity of the steady wind. If the wind-velocity is then reversed, absolutely or relatively, and the inclination of the plane is reversed at the same time, the plane will be urged still further upwards, and the more so the greater its weight. If a heavy body can thus rise, it follows at once that it can also advance against the wind if not too strong, by utilising the energy thus acquired, and descending in the direction whence the wind blows. The main difficulty in constructing a contrivance to effect this would lie in the adjustment of the inclination to a varying wind, but Prof. Langley is confident that this difficulty will not prove insuperable.

THE alleged discovery of the northern end of Greenland in the Nordenskiöld Inlet seems to have been based upon a very bold interpretation of Peary's observations. Peary himself has, in his first account, said nothing about having discovered a passage from Nordenskiöld Inlet to Independence Bay, and the report now issued by his companion, J. Astrup (*Geogr. Selsk. Aarbog*), which gives particulars of what was actually observed, does not allow any conclusion as to a waterway connecting them. It would be strange indeed if Astrup left the discovery of the north end of Greenland unmentioned, as if it were something unessential.

AN ingenious method for making permanent microscopic preparations of particular colonies on a gelatine plate, has been recently devised by Hauser (*Muenchener med. Wochenschrift*, 1893, No. 35). It was found that when exposed for some time to the vapour of formalin, gelatine becomes so rigid that no temperature is able to melt it; even submitting it to the heat of a bunsen flame, or boiling it in a soda solution, fail to liquefy it. This formalin-gelatine becomes, moreover, strongly antiseptic, for when freely exposed to the air no colonies make their appearance, and neither will those organisms grow which are purposely introduced into it. Gegner, in an earlier number of this journal, states that although solutions of formalin had a bactericidal action, the vapour was a far more powerful antiseptic; this investigator also notes that gelatine exposed to this vapour would not melt at 37° C. To prepare bacterial colonies for microscopic examination, Hauser takes a thin film of the solid gelatine containing the particular growth required, and places it on an object glass, and, superposing a cover-glass, seals it from the outer air by a rim of melted gelatine. The preparation is then placed in the formalin chamber for twenty-four hours, during which it becomes quite solid, and on being removed may be further protected by a border of sealing-wax. If it is desired to stain the colonies before the formalin process, the gelatine film should be immersed for twenty-four hours in a weak aqueous solution of fuchsin, by which means the bacterial growth becomes fairly strongly coloured, whilst the gelatine itself only assumes a much paler hue.

WE have received the 1894 *Annuaire* of the Brussels Académie Royale des Sciences, des Lettres et des Beaux-Arts.

"THE Elements of Co-ordinate Geometry," Part I, by W. Briggs and G. H. Bryan (Univ. Corr. Coll. Press), has reached a second edition.

A THIRD edition, enlarged and revised, of Dr. T. Dutton's little book on "Indigestion" (Kimpton, and Hirschfeld Bros.) has been published.

MR. WILLIAM CLAY, Edinburgh, has issued a new catalogue, No. 60, of standard second-hand and new books on physical science offered for sale.

DR. H. WAGNER gives an account, in the *Oesterreichische Botanische Zeitschrift*, of his botanical exploration of the Balkans, in company with Herr J. Stipanics, entomologist.

THE *Journal of Anatomy and Physiology* for January contains an article by Mr. A. Keith, on the ligaments of the Catarrhine monkeys, with references to corresponding structures in man. Profs. J. C. Ewart and A. Macalister are among the other contributors to the number.

THE first part is published of Dr. H. Trimen's "Handbook to the Flora of Ceylon," containing descriptions of all the species of flowering plants indigenous to the island, and notes on their history, distribution, and uses. It is issued under the authority of the Government of Ceylon.

THE Calendar just issued by the Department of Science and Art contains the following names of recently appointed Inspectors of Science and Art Schools:—Dr. E. J. Ball, R. Blair, S. F. Dufton, C. Geldard, Dr. H. H. Hoffert, D. E. Jones, Dr. MacNair, C. McRae, T. Preston, F. Pullinger, Captain T. B. Shaw, R.E., and H. Wager.

THE National Footpath Preservation Society, of which the late Prof. Tyndall was a member, has issued its ninth annual report. The large number of cases of footpath interference, encroachments, &c. described in the report, shows that the society exerts a salutary influence upon those who are inclined to disregard ancient rights.

SUBSCRIPTIONS are invited by Laidley and Co., of Port Elizabeth, to the issue of a complete botanical collection for the Cape Colony, Kaffraria, Natal, Zululand, Swazieland, Matabeleland, Bechuanaland, Mashonaland, the Transvaal, Orange Free State, and the Portuguese territories of the Zambesi. The flora is computed to exceed 20,000 species.

MESSRS. BLACKIE AND SON have sent us several of their Guides to the Science Examinations of the Department of Science and Art. The books contain some useful hints to intending examinees, and answers to questions that have been set at the Departmental examinations. A number of test-papers in mathematics, arranged by Mr. R. Roberts, has also just been published by Messrs. Blackie.

"LA Terre avant l'apparition de l'Homme" (MM. Baillière et Fils) is a bulky tome by Prof. F. Priem, in Brehm's *Merveilles de la Nature* series. In it the author recounts the numerous changes through which our globe has passed in geological time. He describes the distribution of land and water during the well-marked periods of this world's history, and deals particularly with the fauna and flora of bygone days. In the latter half of the work, the geology of France is dealt with in a very detailed manner. The book is *au courant* with recent investigations in geology and palæontology; it contains 850 figures illustrating fossils, geological sections, picturesque regions and interesting formations, and is worthy of a high place in the fine series to which it belongs.

During the last few months we have had the pleasure of commenting upon several chatty books on natural history matters—books in which instruction is happily combined with interest. Another volume of a similar kind, "Random Recollections of Woodland, Fen, and Hill," by Mr. J. W. Tutt (Swan Sonnenschein and Co.), has recently been published. We recommend the book to the nature-lover and entomologist because it contains a large amount of information brightly put and generally accurate; and all who can appreciate the beauties of natural creatures and things would do well to read it.

A VERY important collection of works is being offered for sale by Messrs. W. Wesley and Son. We refer to the Paracelsus Library of Dr. E. Schubert, who died at Frankfort-on-the-Main in 1892. The library contains 194 editions of the writings of Paracelsus, 548 works which partly or chiefly treat of Paracelsus, description of his times and the places where he worked, publications of his friends and opponents, and a selection of 351 works on alchemy. Altogether this unique collection comprises about eleven hundred books, manuscripts, portraits, and tracts, and it is richer in original editions of Paracelsus than that of the British Museum. It is satisfactory to know that no part of the library will be disposed of separately, with the exception of the portion on alchemy.

AN investigation of the mechanics of the interaction of ethyl alcohol and hydrogen chloride is communicated from Prof. Lothar Meyer's laboratory to No. 12, 1893, of the *Zeitschrift für physikalische Chemie* by Mr. Cannell Cain. Solutions of hydrogen chloride of different strengths were obtained by leading the dry gas into the dry alcohol, which was coated by a freezing mixture. A definite quantity of such a solution was then sealed up in a small glass tube, and kept for a definite length of time at a constant temperature in a water bath. The composition of the solution before and after the interaction was ascertained by titrating a known amount with dicinormal soda solution. The results show that concentration and time of reaction being the same, the extent of the chemical change increases rapidly with the temperature. Up to 15° there is no appreciable interaction, but in a solution containing 100 equivalents of alcohol and 81 of hydrogen chloride at 80° some 15 per cent., and at 99° some 50 per cent. of the latter enter into combination in one hour. For a given temperature and concentration the amount of decomposition increases with the time at a rate which gradually diminishes, and finally becomes zero. Temperature and time of reaction being the same, it is also shown that increase in the quantity of alcohol in the above solution, or addition of water or ethyl chloride, retard the rate of change. By experiments with water and ethyl chloride the author makes clear the reversible character of the action, and next makes observations to ascertain the relative proportions of the substances present when equilibrium is established. In these experiments various solutions of hydrogen chloride in alcohol, alone, and in presence of different amounts of water are employed. Here it is shown that Guldeberg and Waage's law is obeyed, as the product of the active masses of alcohol and hydrogen chloride bears a constant ratio to the product of those of water and ethyl chloride unless in cases where ethyl chloride separates out, and the solutions thus become heterogeneous. If the alcohol and hydrogen chloride be present in equivalent amounts the results indicate that the equation $C_2H_5OH + HCl + 3C_2H_5Cl + 3H_2O$ approximately represents the condition of things when equilibrium is attained.

IN the review of Mr. Richard Inwards' "Weather Lore," that appeared in these columns on January 4, p. 219, the author's attention was commended to a collection of "wise saws" made for the U.S. Signal Service by Major Dunwoody. Mr. Inwards points out to us that his book contains extracts from this collection, and that he acknowledges his obligations to it in the introduction. We regret that this acknowledgment was overlooked by the writer of the notice.

THE additions to the Zoological Society's Gardens during the past week include two Mozambique Monkeys (*Cercopithecus pygerythrus*) from East Africa, presented respectively by Mr. H. P. East and Mrs. Adams; two Common Marmosets (*Hapale jacchus*) from South-east Brazil, a Common Hamster (*Cricetus frumentarius*) European, presented by Mrs. Brightwen; two Jackdaws (*Corvus monedula*) British, presented by Miss Williams; a Clifford's Snake (*Zamenis Cliffordi*) from Egypt, presented by Mr. W. L. Tod; a Malaccan Parrakeet (*Palæornis longicauda*) from Malacca, deposited; a Snow Leopard (*Felis uncia*) from Lahoul, Punjaub, Himalayas, an Alpine Marmot (*Arctomys marmotta*) European, two Hairy Armadillos (*Dasypus villosus*), a Black-necked Swan (*Cygnus nigricollis*), two Rufous Tinamous (*Rhynchotus rufescens*), two Brazilian Caracaras (*Polyborus brasiliensis*), two Common Teguexins (*Tupinambis teguexin*), a Common Boa (*Boa constrictor*) from South America, a Melodius Jay Thrush (*Leucodioptron canorum*) from China, purchased; two Lapwings (*Vanellus vulgaris*), two Dunlins (*Tringa alpina*) British, received in exchange.

OUR ASTRONOMICAL COLUMN.

SUNSPOTS AND SOLAR RADIATION.—Spectroscopic observations, the discussion of the frequency of tropical cyclones, and cyclical variations of barometric pressure, indicate that the greatest amount of heat is received from the sun by the earth during a maximum epoch of solar activity. But, on the other hand, the discussions of statistics of air temperature and solar radiation suggest that that the sun's heat is greatest when his surface is least spotted. Some new facts in connection with this paradox are described by M. R. Savélief in the current *Comptes Rendus*, and seem to combat the latter result. He has made a large number of observations with a Crova's actinograph since June 1890, and compared them with the late Dr. Wolf's numbers showing the relative frequency of solar spots. A few observations are given indicating that the solar constant increases with the increase of solar activity. M. Savélief has also calculated the mean quantity of heat received on one square centimetre of horizontal surface on the ground during one day, and for an hour of solar radiation. The results obtained by this method, like those deduced from the solar constant, point to the conclusion that the calorific intensity of solar radiation increases with the activity of the phenomena visible upon the surface of the sun, that is to say, with the increase of solar spottedness. These results are diametrically opposed to those obtained by previous investigators (see NATURE, vol. xliii. p. 583), and, if they are confirmed, a real difficulty in the way of explaining the correlation of solar and meteorological phenomena will have been removed.